ProSoft® TECHNOLOGY

Where Automation Connects.



IMC-BHx-AC

Industrial Media Converter

Ethernet over Belden 9463 “Blue Hose”

July 24, 2014

INSTALLATION GUIDE

Your Feedback Please

We always want you to feel that you made the right decision to use our products. If you have suggestions, comments, compliments or complaints about our products, documentation, or support, please write or call us.

How to Contact Us

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IMC-BHx-AC Installation Guide
July 24, 2014

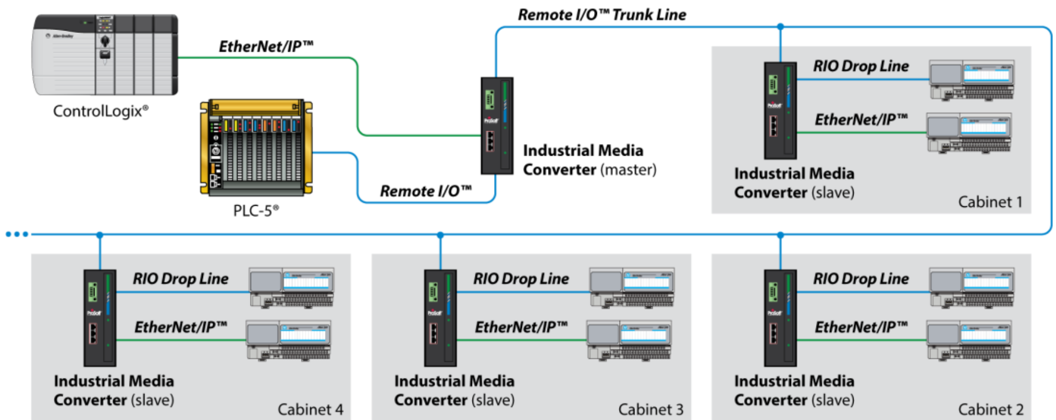
ProSoft Technology® Product Documentation

In an effort to conserve paper, ProSoft Technology no longer includes printed manuals with our product shipments. User Manuals, Datasheets, Sample Ladder Files, and Configuration Files are provided on the enclosed DVD in Adobe® Acrobat Reader file format (.PDFs). These product documentation files may also be freely downloaded from our web site: www.prosoft-technology.com

Contents

1 Start Here

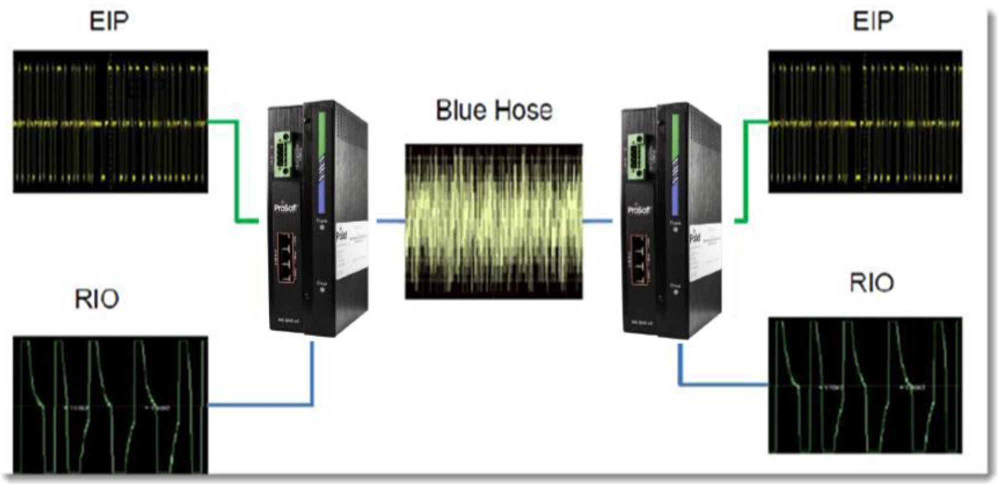
The IMC-BHx-AC family of media converters allow for the simultaneous multi-drop transport of EtherNet/IP™ and Remote I/O data over repurposed Belden 9463 “Blue Hose” cabling.



Each Master (IMC-BHM-AC) and Slave (IMC-BHS-AC) module supports Remote I/O networks operating at 57.6K or 115.2K baud rates. The modules are automatically configured to the baud rate of the remote I/O data.

Three Ethernet ports are also available on the Master and Slave modules allowing up to three Ethernet devices to be connected to the media converter before a switch is required.

Both EtherNet/IP™ and Remote I/O data are simultaneously encoded by the Master or Slave module into a modulated broadband signal that is transported via a baseband subcarrier over the repurposed “Blue Hose” cabling. The complex waveform carrying EtherNet/IP and Remote I/O data is then received by the Master or Slave module and the original EtherNet/IP and Remote I/O data is decoded.



Additionally, Repeater modules (IMC-BHR-AC) can be used to transport the combined EtherNet/IP and Remote I/O signal even further for applications that require longer lengths of “Blue Hose” cable.

1.1 Master

Each network requires one Master device. The device is installed within 25 feet of the controller and provides:

- 3 Ethernet ports (expandable via switch)
- 1 RIO Trunk port
- 1 RIO Drop port

Note: *The Trunk line requires a 150 Ohm resistor at each end. Each drop line also requires a 150 Ohm resistor.*

1.2 Slave

Each network requires at least one Slave device. Slaves communicate with the RIO nodes and provide:

- 3 Ethernet ports
- 1 RIO Trunk port
- 1 RIO Drop port

Up to eight RIO nodes within 1000 feet may be daisy-chained off the drop line.

1.3 Repeater

Repeaters are required when there are more than six Media Converter Slaves and/or the maximum trunk cable length exceeds the maximum distance specified in the table at the end of this guide.

2 Before You Begin

Consider the following points before installing the module:

- Each system requires one Master unit connected to the PLC
- Each system can have up to six Slave units before a Repeater is required
- Each Slave unit can have up to eight Remote I/O nodes connected to it
- A Repeater is required if the overall network distance exceeds 1300 to 1750 feet (see Performance Chart at the end of this guide)

2.1 Package Content

The following tables show the components including with IMC-BHx-AC modules. Ensure that all items are present before starting the installation.

IMC-BHM-AC (Master)

Qty	Part Name	Part Number	Description
1	IMC-BHM-AC Module	IMC-BHM-AC	Ethernet over Blue Hose Industrial Media Converter
4	150 Ohm Resistors	102-1500	RES 150 Ohm Term Block Pluggable, GRN, Screw Flange (144-0050)
2	3-pin Connectors	357-0149	CONN, 3 Pos Term Block Pluggable, GRN, Screw Flange (173-0008)
1	4-pin Connectors	357-0148	CONN, 4 Pos Term Block Pluggable, GRN, Screw Flange (173-00009)
1	ProSoft Solutions DVD	DVD-001	Contains documentation for the IMC-BHx-AC

IMC-BHS-AC (Slave)

Qty	Part Name	Part Number	Description
1	IMC-BHS-AC Module	IMC-BHS-AC	Ethernet over Blue Hose Industrial Media Converter
4	150 Ohm Resistors	102-1500	RES 150 Ohm Term Block Pluggable, GRN, Screw Flange (144-0050)
2	3-pin Connectors	357-0149	CONN, 3 Pos Term Block Pluggable, GRN, Screw Flange (173-0008)
1	4-pin Connectors	357-0148	CONN, 4 Pos Term Block Pluggable, GRN, Screw Flange (173-00009)

IMC-BHR-AC (Repeater)

Qty	Part Name	Part Number	Description
1	IMC-BHR-AC Module	IMC-BHR-AC	Ethernet over Blue Hose Industrial Media Converter
4	150 Ohm Resistors	102-1500	RES 150 Ohm Term Block Pluggable, GRN, Screw Flange (144-0050)
2	3-pin Connectors	357-0149	CONN, 3 Pos Term Block Pluggable, GRN, Screw Flange (173-0008)
1	4-pin Connectors	357-0148	CONN, 4 Pos Term Block Pluggable, GRN, Screw Flange (173-00009)

Please contact ProSoft Technology Technical Support for replacement parts if any of the above components are missing.

3 Installation

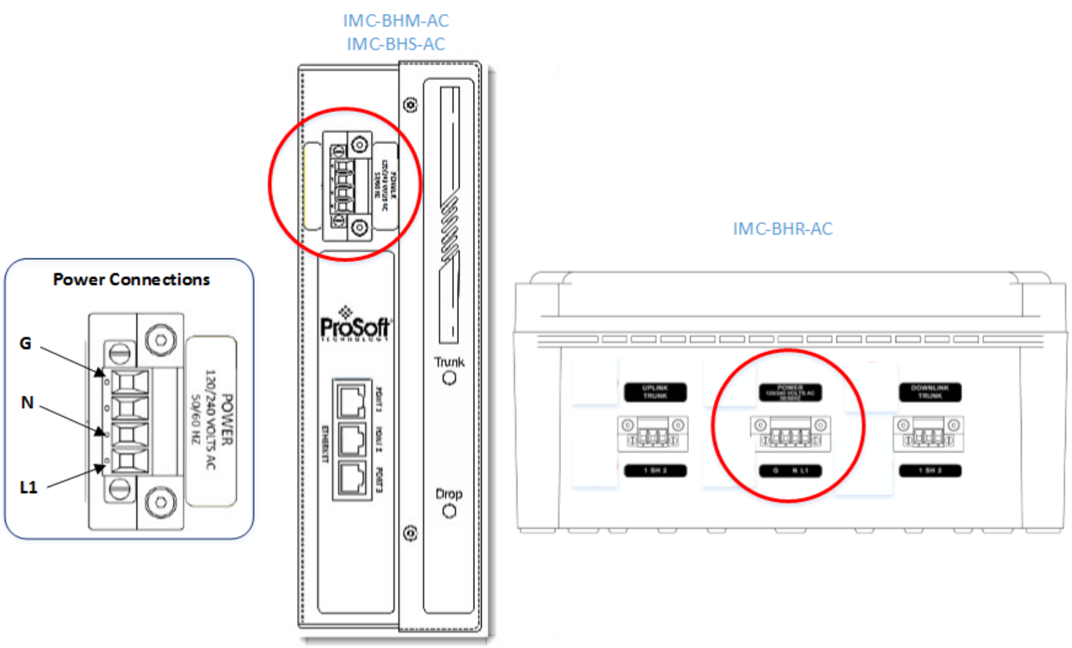
3.1 Mounting

The Master and Slave units are DIN-rail mountable. The Repeater units are Panel Mount. The Master must be located near the PLC. The Slaves should be located in the vicinity of the Remote I/O nodes.

Warning: *Please follow all safety instructions when installing this or any other electronic devices. Failure to follow safety procedures could result in damage to hardware or data, or even serious of death to personnel. Refer to the documentation for each device to be connected to verify that suitable safety procedures are in place before installing or servicing this device.*

3.2 Powering the Devices

The power terminal is located on the front of the device as shown in the following diagram. This is a 4-pin power connector.



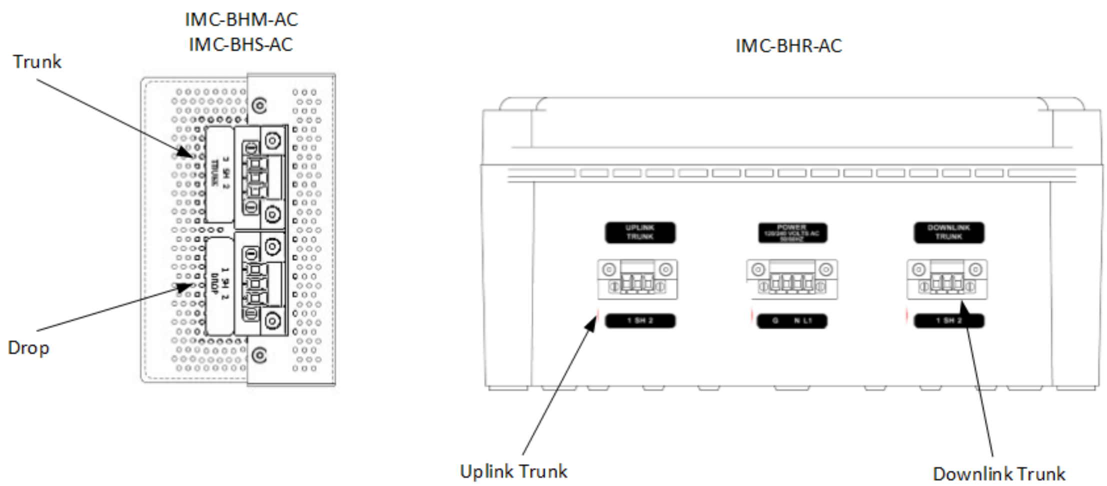
3.3 Cabling

General Usage

- ***Trunk /Drop Connection*** **–** Remote I/O devices should only be connected to the DROP connector of the Master or Slave units. Never connect RIO devices directly to the TRUNK connector. The TRUNK signals contain high-frequency signals that may damage the Remote I/O device.
- ***Trunk/ Drop Termination*** **–** Each trunk segment, as well as each Drop Line of Blue Hose cabling should be terminated with (2) 150 Ohm Resistors (one on each end of the physical cable). Always remove any existing 82 Ohm resistors.

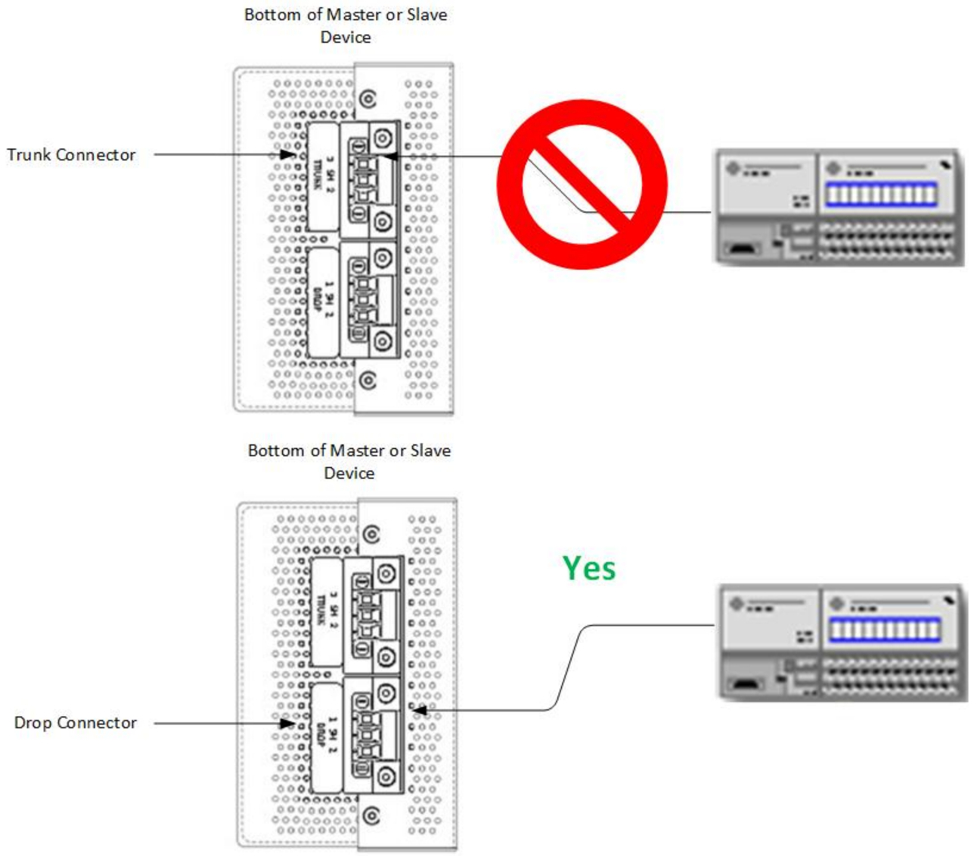
3.4 Cabling Location & Examples

There are two Remote I/O connectors located at the bottom of the device as shown in the following diagram.

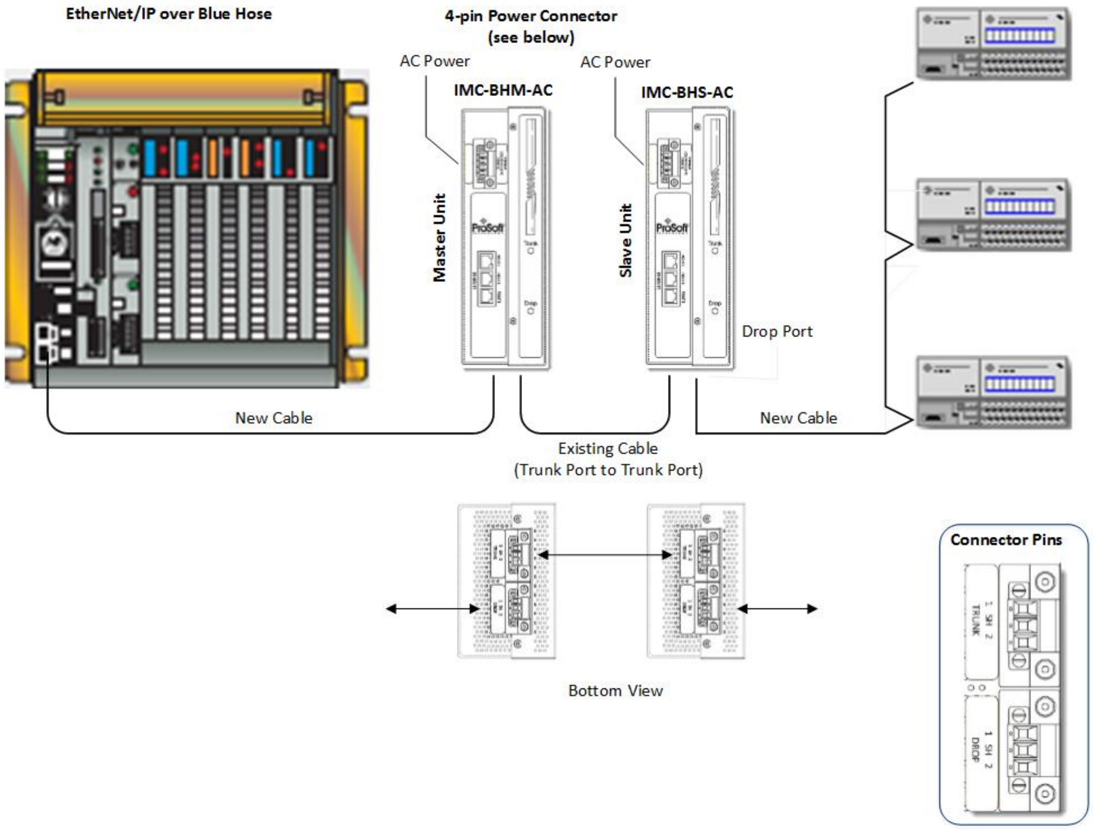


The **TRUNK** connector is used for the repurposed Blue Host cable. The **DROP** connector is used for the local Remote I/O network.

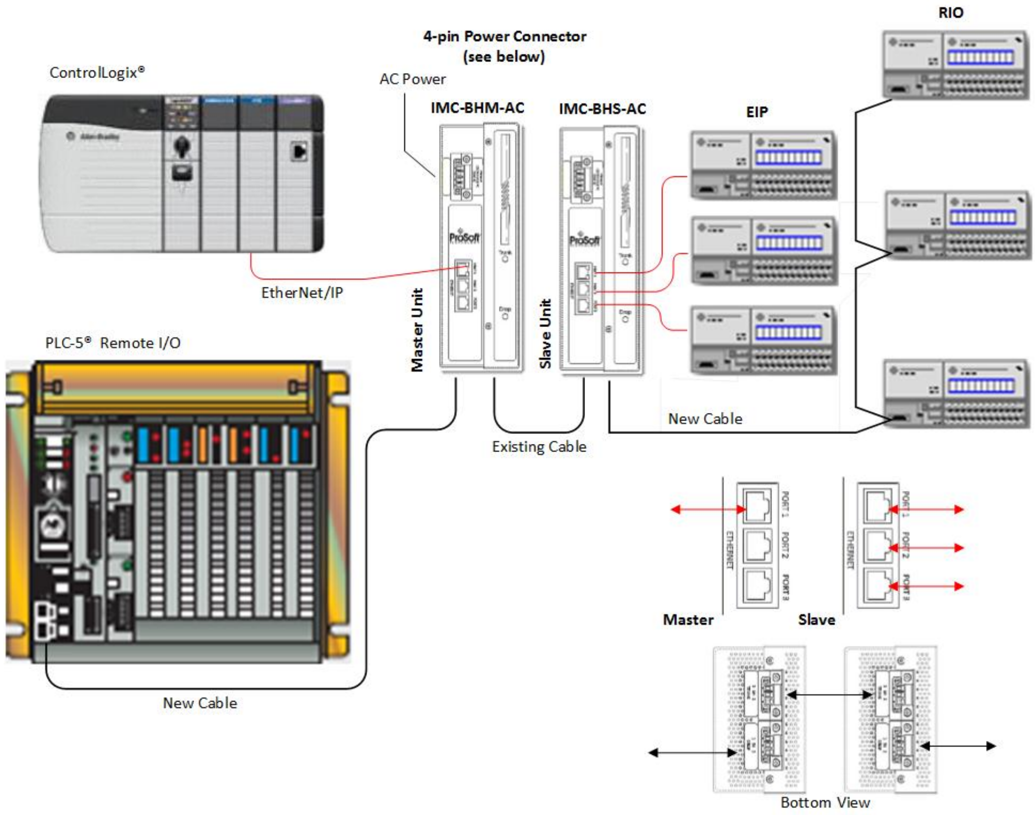
Do NOT attempt to connect a remote I/O network device to a Master or Slave Trunk connector.



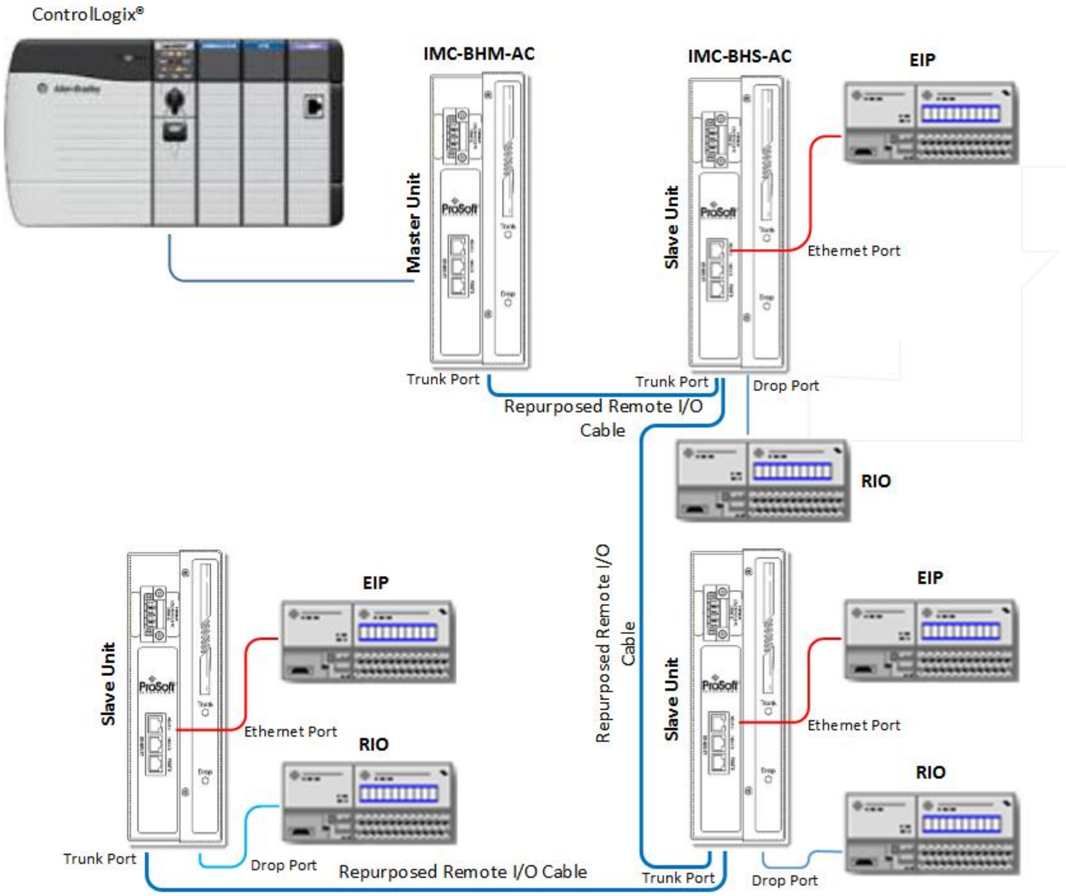
The following diagram shows the cabling configuration between a PLC-5 and RIO devices:



The device also provides three RJ-45 Ethernet connectors located on the front of the unit. These are used for the CLX EtherNet/IP™ controllers.



Multipoint Example
This example shows three Slaves connected to a single Master.



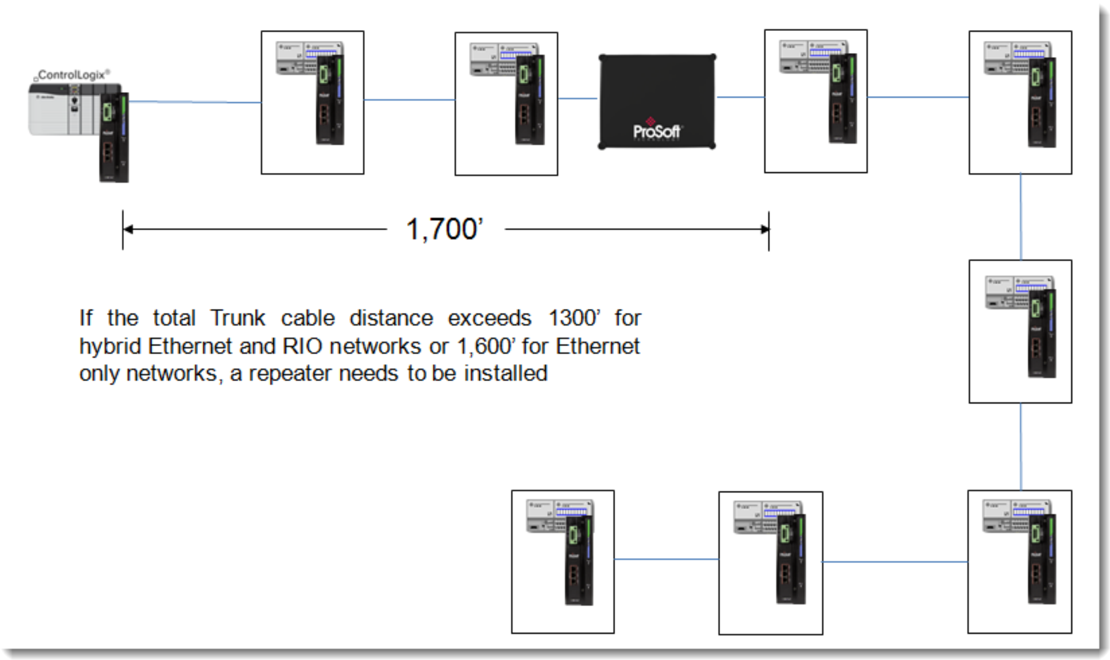
3.5 Using a Repeater

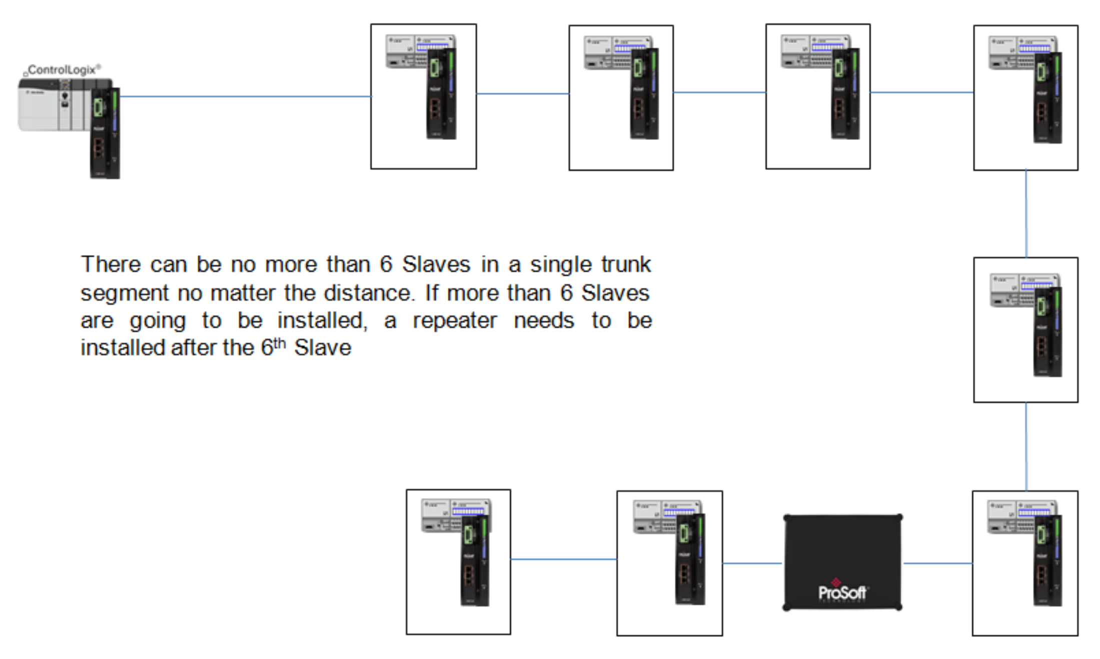
The number of Slave units and nodes dictate the usage of a Repeater. Refer to the Specification and Performance Charts.

3.5.1 Using Repeaters on the Network

Repeaters should be used in a system when any of the following conditions exist:

- More than six slaves are being used.
- More than 1750 feet of Blue Hose Trunk will be used in an Ethernet-only system.
- More than 1300 feet of Blue Hose Trunk will be used in an Ethernet and Remote I/O system.


ControlLogix®
ProSoft
1,700'
If the total Trunk cable distance exceeds 1300' for hybrid Ethernet and RIO networks or 1,600' for Ethernet only networks, a repeater needs to be installed


ControlLogix®
There can be no more than 6 Slaves in a single trunk segment no matter the distance. If more than 6 Slaves are going to be installed, a repeater needs to be installed after the 6th Slave
ProSoft

4 LED Functionality

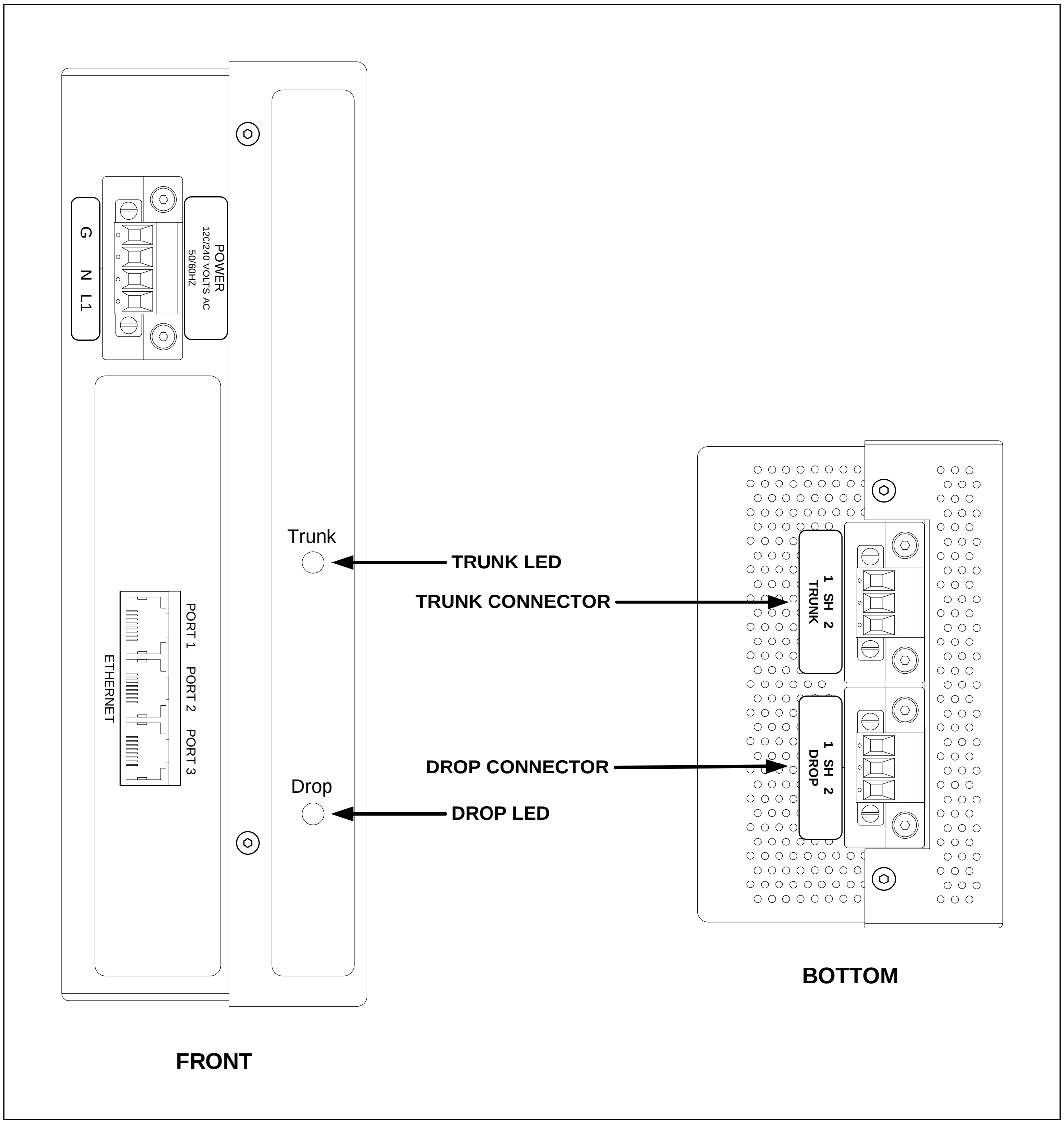
4.1 Remote I/O Serial Status LEDs

***Trunk Status LED = Trunk* –** (Green, Yellow, or Red). Monitors the status of the trunk connection between each Master, Slave, or Repeater.

RIO Drop Status LED = DROP - (Green, Yellow, or Red). Monitors the status of local Remote I/O connections between Remote I/O nodes

Color	Status	Description
Green	Remote I/O Good (RIO Traffic Active)	Remote I/O Signal Detected. (Immediate LED response from Yellow to Green) Integration of RIO serial data wave for is acceptable
Yellow	Remote I/O Loss (RIO Timed Out)	No Valid Remote Signaling Detected. (Analysis window time up to 30 seconds)
Red	Remote I/O Error (RIO Squelched)	No Remote I/O Signal Detected. (Red error indicates RIO signal health is out of bounds) Integration of RIO serial data waveform is outside of acceptable operating range. Squelch activated causes module to stop all transmission into Trunk and Drop when Red.

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POWER
120/240 VOLTS AC
50/60HZ
G N L1
ETHERNET
PORT 1
PORT 2
PORT 3
Trunk
Drop
TRUNK LED
TRUNK CONNECTOR
DROP CONNECTOR
DROP LED
1 SH 2
TRUNK
1 SH 2
DROP
BOTTOM
FRONT

5 Reference

5.1 Device Specifications

IMC-BHM-AC (Master)

Dimensions:	8.3 x.2.7 x 4.3 in. (2.10 x 67.6 x 108.7mm)
Weight:	1 lb 15 oz. (0.879 kg)
Power:	120/240 VAC (-15%/+10%) 60/50 Hz 2 Amps Max (5 Watt Nom)
Operating Temp:	0°C to +60°C
Storage Temp:	-40°C to +80°C
Humidity:	10% to 90% (non-condensing)
LEDs (G,Y, R)	Trunk Status (Tri0Color), Drop Status (Tri-Color)
Ethernet Ports:	Local 3 Port 10/100 Ethernet RJ-45
Cabling Type (Trunk Drop):	Belden 9463 “Blue Hose”
Ethernet Bandwidth:	1-4 Mbps (20-40 Mbps Peak)
Remote I/O Baud Rates:	57.6K and 115.2K
Din Rail Mountable:	Yes

IMC-BHS-AC (Slave)

Dimensions:	8.3 x.2.7 x 4.3 in. (2.10 x 67.6 x 108.7mm)
Weight:	1 lb 15 oz. (0.879 kg)
Power:	120/240 VAC (-15%/+10%) 60/50 Hz 2 Amps Max (5 Watt Nom)
Operating Temp:	0°C to +60°C
Storage Temp:	-40°C to +80°C
Humidity:	10% to 90% (non-condensing)
LEDs (G,Y, R)	Trunk Status (Tri0Color), Drop Status (Tri-Color)
Ethernet Ports:	Local 3 Port 10/100 Ethernet RJ-45
Cabling Type (Trunk Drop):	Belden 9463 “Blue Hose”
Ethernet Bandwidth:	1-4 Mbps (20-40 Mbps Peak)
Remote I/O Baud Rates:	57.6K and 115.2K
Din Rail Mountable:	Yes

IMC-BHR-AC (Repeater)

Dimensions:	13.5 x.11 x 5.5 in. (342.9 x 279.4 x 139.7 mm)
Weight:	11 lbs 6 oz. (5.159 kg)
Power:	120/240 VAC (-15%/+10%) 60/50 Hz 4 Amps Max (10 Watt Nom)
Operating Temp:	0°C to +60°C
Storage Temp:	-40°C to +80°C
Humidity:	10% to 90% (non-condensing)
Cabling Type (Uplink Trunk/Downlink Trunk):	Belden 9463 “Blue Hose”
Ethernet Bandwidth:	1-4 Mbps (20-40 Mbps Peak)
Remote I/O Baud Rates:	57.6K and 115.2K
Din Rail Mountable:	Yes

5.2 Maximum System Specifications

Single Trunk Segment Systems (Without Repeaters)

Number of RIO devices on Drop:	8
Drop Overall Length:	1000 feet
Number of Slaves on Trunk:	8
Trunk Overall Length (Ethernet and Remote I/O:	1300 feet
Trunk Overall Length:	1600 feet

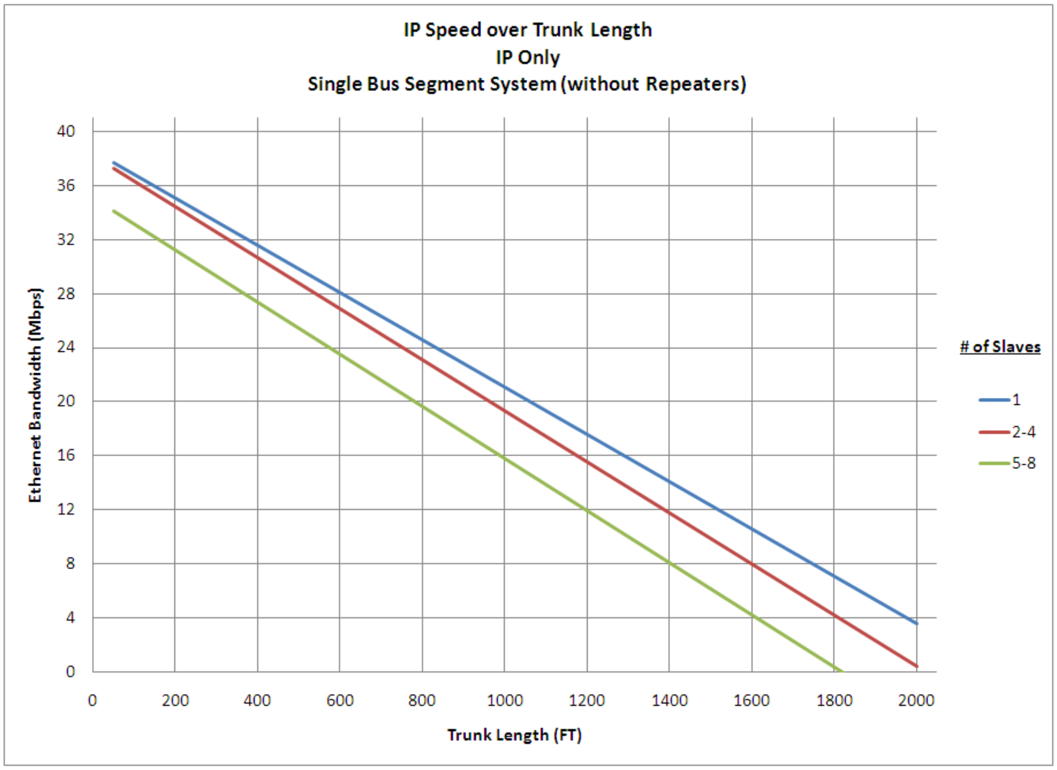
Multiple Trunk Segment Systems (With Repeaters)

Number of RIO devices on Drop:	8
Drop Overall Length:	1000 feet
Number of Slaves on Trunk:	6
Trunk Overall Length (Ethernet and Remote I/O:	1200 feet
Trunk Overall Length:	1750 feet

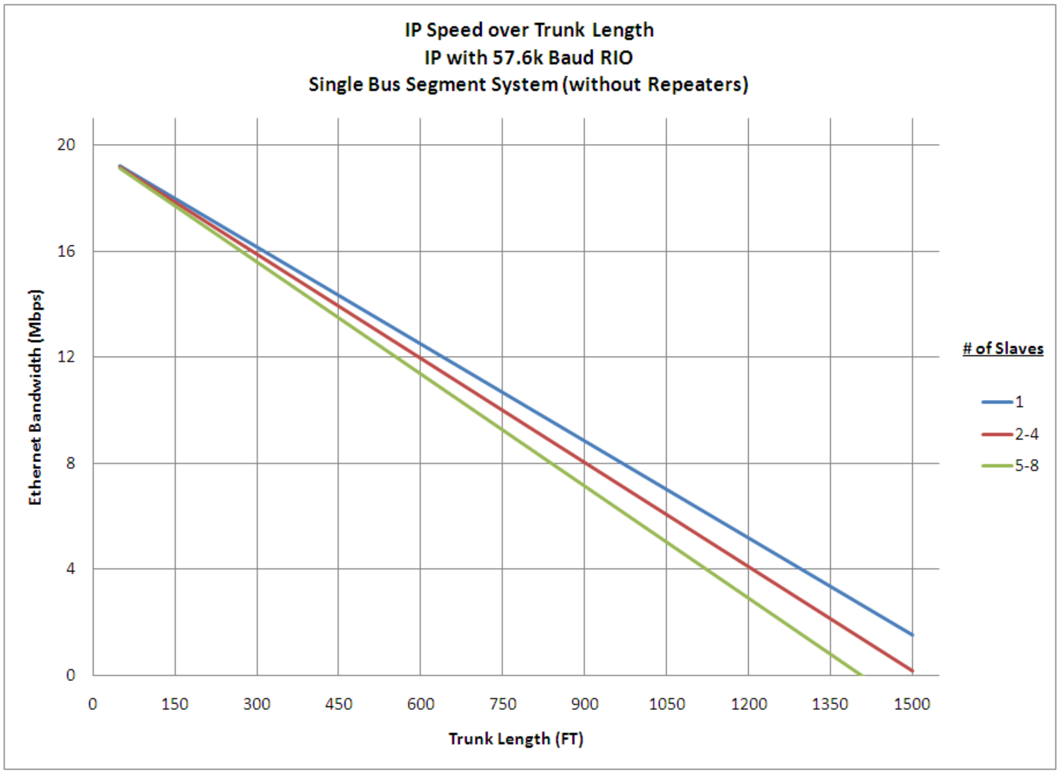
5.3 Typical Performance Characteristics

5.3.1 Single Bus Segment System (Without Repeaters)

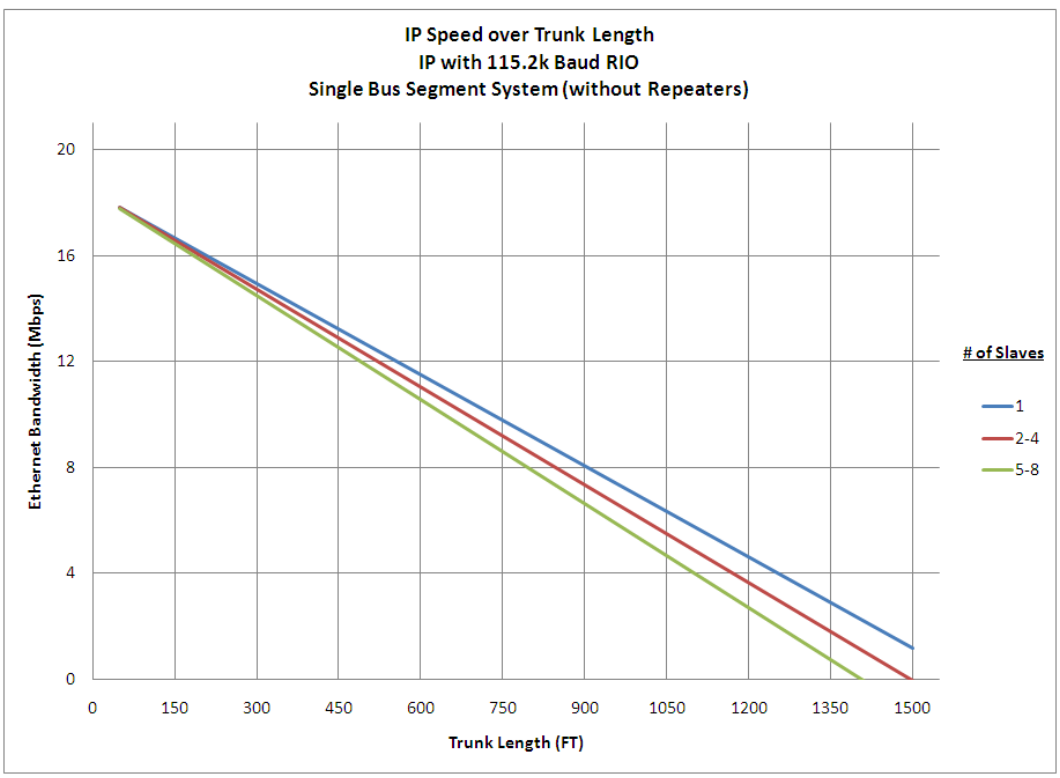
IP Only (Up to 8 Slaves per Bus Segment)



IP with 57.6K Baud Remote I/O (Up to 8 Slaves per Bus Segment)

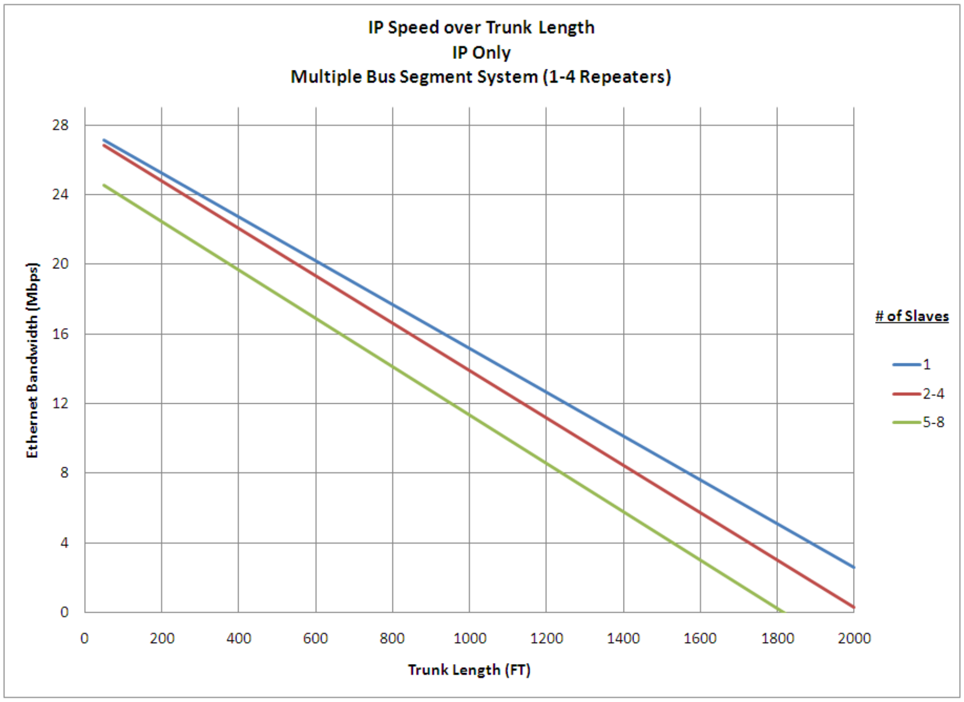


IP with 115.2K Baud Remote (Up to 8 Slaves per Bus Segment)

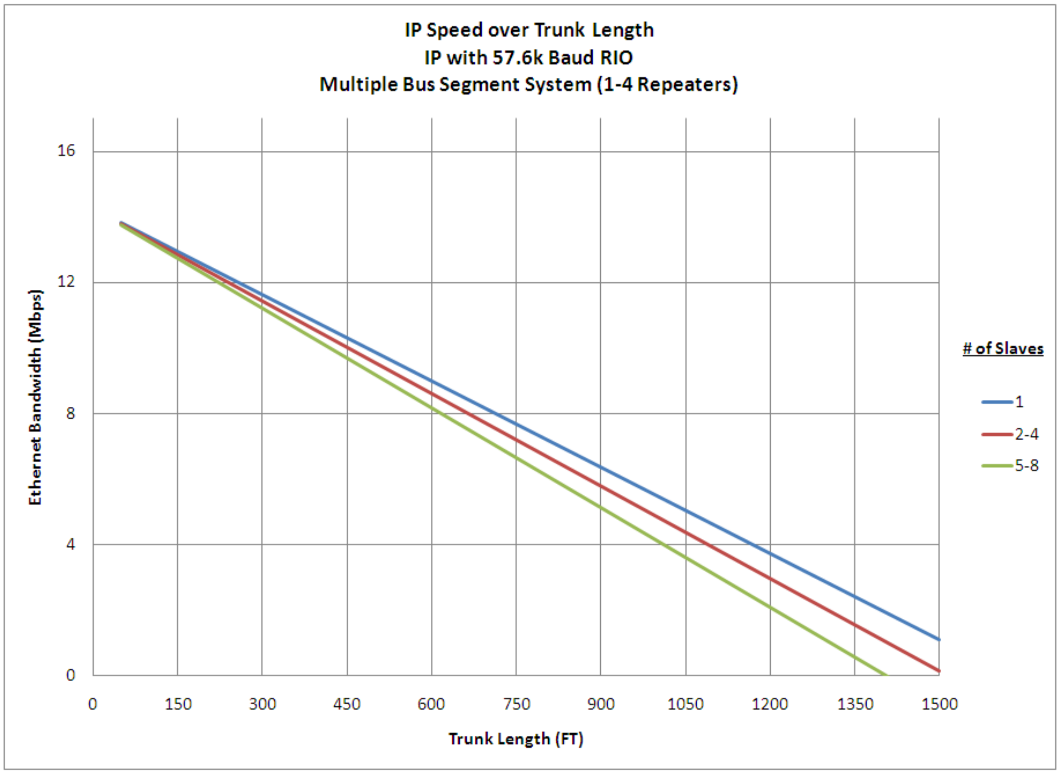


5.3.2 Multiple Bus Segment System (1 – 4 Repeaters)

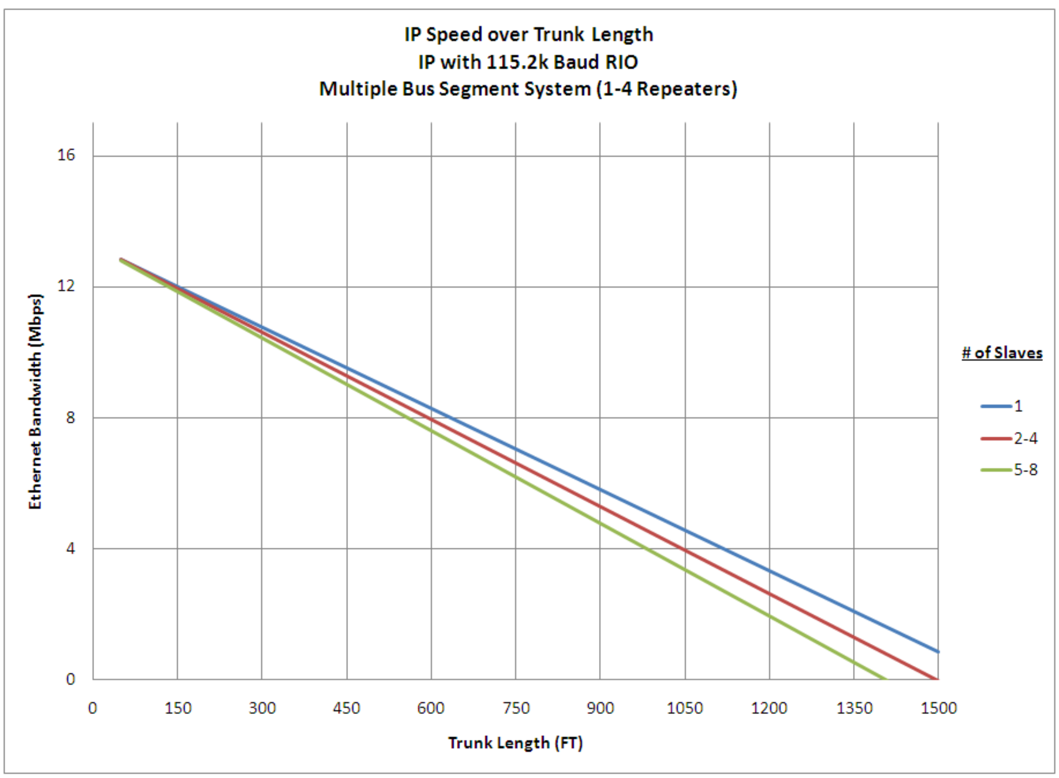
IP Only (Up to 6 Slaves per Bus Segment)



IP with 57.6K Baud Remote I/O (Up to 6 Slaves per Bus Segment)



IP with 115.2K Baud rate Remote I/O (Up to 6 Slaves per Bus Segment)

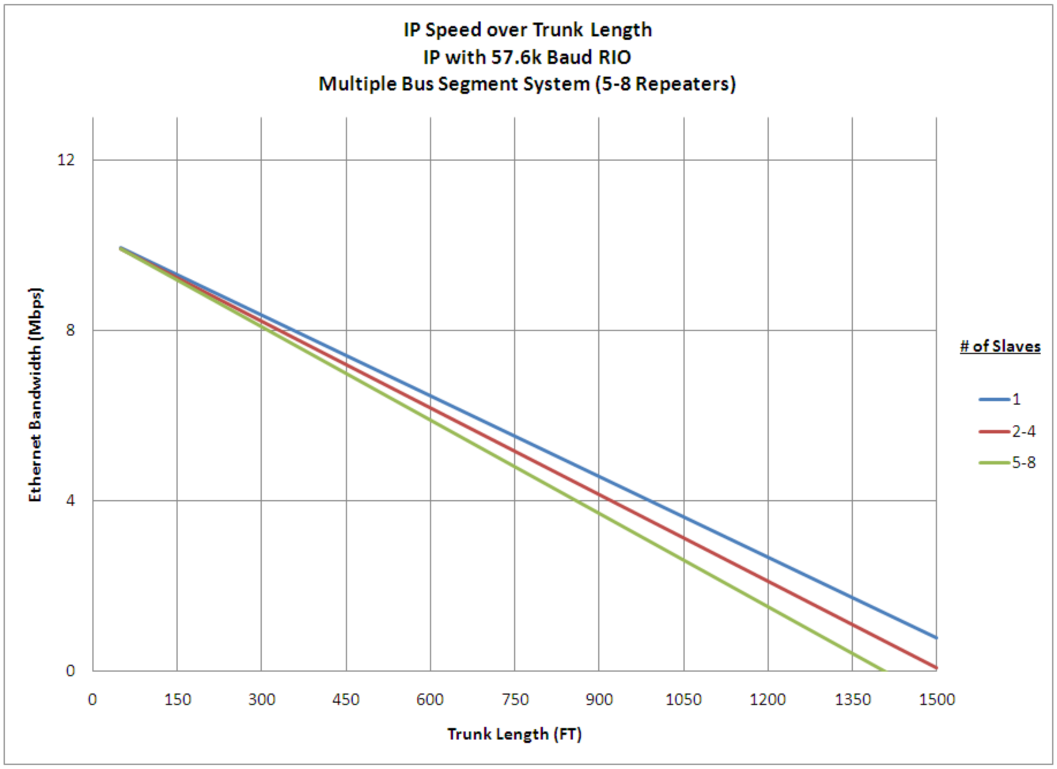


5.3.3 Multiple Bus Segment System (5 – 8 Repeaters)

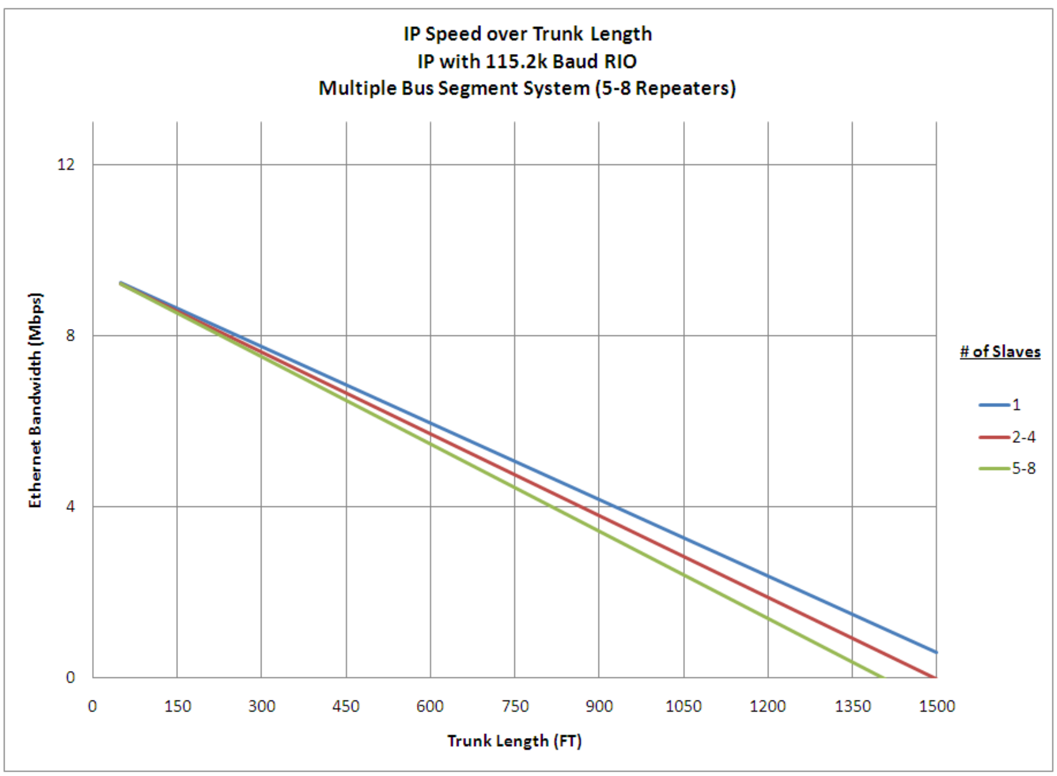
IP Only (Up to 6 Slaves per Bus Segment)



IP with 57.6K Baud Remote I/O (Up to 6 Slaves per Bus Segment)



IP with 115.2K Baud Remote I/O (Up to 6 Slaves per Bus Segment)



6 Support, Service & Warranty

Contacting Technical Support

ProSoft Technology, Inc. (ProSoft) is committed to providing the most efficient and effective support possible. Before calling, please gather the following information to assist in expediting this process:

- Product Version Number
- System architecture
- Network details

If the issue is hardware related, we will also need information regarding:

- Module configuration and associated ladder files, if any
- Module operation and any unusual behavior
- Configuration/Debug status information
- LED patterns
- Details about the serial, Ethernet or fieldbus devices interfaced to the module, if any.

Note: *For technical support calls within the United States, an after-hours answering system allows 24-hour/7-days-a-week pager access to one of our qualified Technical and/or Application Support Engineers. Detailed contact information for all our worldwide locations is available on the following page.*

Internet	Web Site: www.prosoft-technology.com/support E-mail address: support@prosoft-technology.com
Asia Pacific (location in Malaysia)	Tel: +603.7724.2080, E-mail: asiapc@prosoft-technology.com Languages spoken include: Chinese, English
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Brasil (location in Sao Paulo)	Tel: +55-11-5083-3776, E-mail: brasil@prosoft-technology.com Languages spoken include: Portuguese, English

6.1 Warranty Information

For complete details regarding ProSoft Technology's TERMS & CONDITIONS OF SALE, WARRANTY, SUPPORT, SERVICE AND RETURN MATERIAL AUTHORIZATION INSTRUCTIONS please see the documents on the Product DVD or go to www.prosoft-technology/warranty

Documentation is subject to change without notice.